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THE TEACHING OF AGRICULTURE IN THE RURAL COMMON SCHOOLS.[a]

In accordance with the apparent wishes of the association as expressed in an informal discussion of the report of this committee, at the meeting in Washington last November, this ninth report of the committee on methods of teaching agriculture is devoted to a discussion on the feasibility of teaching agriculture in the rural common schools, and suggestions regarding the nature and extent of such teaching. In this discussion the term "common schools" is taken to mean schools giving instruction in grades below those of the high school, and the term "rural schools" will include not only the schools in extremely rural districts, but also those in villages and small towns which draw largely on the adjacent country for pupils and financial support. It should also be understood that in this report attention is confined to matters relating to the teaching of agriculture in the rural schools as ordinarily organized in our public school system. We have not undertaken here to discuss the advisability of the establishment of county or district elementary schools of agriculture as separate institutions or the courses of instruction suitable for such schools.

DEVELOPMENT OF INDUSTRIAL TRAINING IN THE COMMON SCHOOLS.

Industrial training as a subject for regular instruction in the common schools has been until recently confined largely to manual training in the city schools, and even in these schools it is still far from being fully developed. However, the number of schools in which manual training (other than drawing) is given has increased

[a] The ninth report of the committee on methods of teaching agriculture of the Association of American Agricultural Colleges and Experiment Stations, which was presented to the convention of the association held at Des Moines, Iowa, November 1–3, 1904. For previous reports see U. S. Dept. Agr., Office of Experiment Stations Buls. 41, p. 57; 49, p. 29; 65, p. 79; 76, p. 39; 99, p. 86; 115, p. 59; 123, p. 45; 142, p. 63, and Circs. 32, 37, 39, 41, 45, 49, and 55.

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rapidly during the past thirteen years. In 1890, when the Bureau of Education first began publishing the statistics of manual training in the United States, there were only 37 cities of 8,000 population and over in which manual training was taught in the public schools; in 1902 there were 270 such cities. The schools referred to are those in which other subjects than manual training are mainly taught.[a] In 25 of these schools manual training is given in all grades, including the high school; in 64 it begins with the first grade; in 33 it is confined to the high school, and in 206 (more than three-fourths of all the schools) it is given in some of the grammar grades.

The introduction of manual training into courses of study which were already crowded has involved problems requiring close and careful study of the needs of the pupils, and has generally resulted in greatly increasing the efficiency of the schools in which manual training is now taught. The effort has been made to retain all the essentials of the branches commonly taught in such schools and add the manual training. This has been done by a careful grading of the pupils, by securing better teachers and text-books, and by judicious and careful elimination of the nonessentials in the various branches.

The time to be given to musical training, so that it will not interfere with efficient instruction in other branches, has been carefully considered, and experiments with regard to this have been tried. Some idea of the time occupied by manual training in some of our larger cities can be gained from the following statements: In Boston 2 hours per week are devoted to manual training throughout the fourth to ninth grades, inclusive, the boys having drafting, woodworking, and clay modeling, and the girls sewing and cooking. Manual training in the schools of New York City extends through seven grades, with a total of 4 hours per week for both boys and girls during the first $5\frac{1}{2}$ years, and $4\frac{1}{2}$ hours during the second half of the sixth year and all of the seventh year. In the seventh and eighth grades of the Washington schools the girls have one two-hour exercise a week in cooking and sewing, and the boys a similar period in woodworking. In Allegheny the boys have shopwork $2\frac{1}{2}$ hours and drawing $1\frac{1}{2}$ hours a week for three years, and a supplementary course of one year. In Toledo each ward school has one manual training period of $1\frac{1}{4}$ hours a week. The time devoted to manual training in Los Angeles is two 20-minute periods a week through the first four grades, and three 25-minute periods throughout the next four grades. The work includes paper folding and cutting, raffia work, reed basketry, cardboard construction, sloyd, drawing, shop practice, sewing, and cooking. In San

[a] There were also in 1902 163 schools devoted chiefly to manual and industrial training.

Francisco manual training for boys includes one lesson per week of 50 to 60 minutes in the seventh and eighth grades. Comparatively few of the schools having manual training give less than an hour a week to this work, and the great majority allow two or more hours for it. In most cases the work extends over three, four, or more years. The average cost of the plant for manual training in the 270 cities reporting work of this kind in 1902 (not including manual training high schools) was $20,000, making a total investment for this purpose of $5,400,000. The current expenditures for teachers, materials, tools, etc., in 1901–2 were nearly $1,000,000.

MOVEMENT TO INTRODUCE AGRICULTURE INTO THE RURAL SCHOOLS.

More recently there has developed a movement to introduce the elements of agriculture into the rural schools. This movement has been largely an outgrowth of the nature-study movement, which for a number of years has been encouraged by such agencies as the Cornell University Bureau of Nature Study and the agricultural colleges in a number of other States, as well as by many prominent educators connected with other kinds of schools and colleges. Then came the school-garden movement, and in this, as in the nature-study movement, the city schools have led those in the country, partly because the children in the city schools have taken a greater interest in such work on account of its novelty to them, and partly because the city schools, through better organization and equipment and special teachers, have been able to make experiments of this kind more readily than the rural schools. In these experiments, as might have been expected, mistakes were made. Nature study, according to some of its advocates, was to be elementary science, with a long list of scientific names, with classifications based on stipules, scales, and caudal appendages, and with a "why" for everything. It involved such a universal knowledge of science that teachers were appalled at the prospect of having to prepare for the innovation. On the other hand, some of the advocates of nature study would have no formality, no classification, no plan—whatever came to hand was a subject for nature study. Facts were to be learned, not because of any bearing that they might have upon the symmetrical development of the children's faculties, but simply because they were interesting. There was no logical beginning to such study, no pedagogical sequence, no end. Fortunately there were other teachers and students of education who took neither of these extreme views, but who saw in nature study an opportunity to bring the children into more sympathetic and helpful relations with their natural environment, and at the same time increase their fund of useful knowledge. These teachers, when located in city schools, have brought to the consideration of

their nature-study classes the trees, shrubs, flowers, and vines found around the city homes, in the parks, and in the lawns, and have studied the insects, birds, and other animal life of the city in relation to this plant life. In the country they have considered the plants, animals, birds, and insects which surround the farmer and aid or hinder him in his work, giving much attention to their economic importance and very little to any marked peculiarities they might chance to possess. Such nature study forms an excellent basis for the subsequent study of more formal agriculture. It has been tried in both city and country schools, and has been found to furnish not only a means for arousing and sustaining the interest of the children, but also through its economic limitations an outline sufficiently definite to enable the teacher to know where to stop, and yet sufficiently flexible to enable her to adapt it to local conditions.

Nature study such as this, having an agricultural trend, is about all that has been attempted in the way of teaching agriculture in the rural schools until quite recently. Within the past two or three years, however, State superintendents of public instruction, the officers of some of the agricultural colleges, the National Educational Association, the American Civic Association, as well as a number of other organizations and numerous individuals in various official positions have interested themselves in the introduction of elementary agriculture and gardening in the rural schools. The National Educational Association now has a special committee of educators of national repute considering this subject. The American Civic Association has one department devoted to children's gardens and another to rural improvement. Last June, in Chicago, an organization known as the American League of Industrial Education was organized to—

> Conduct an educational campaign for an industrial public school system which should include the teaching of domestic science and both agricultural and manual training in all public schools; * * * to promote the establishment of school gardens in connection with all public schools, where every child would be taught to be a lover of nature and of the country, and trained toward the land as a source of livelihood, rather than away from it; * * * to advocate the establishment of public manual-training school farms in every county in the United States and of as many such manual training school farms in the vicinity of all cities, by State, municipal, and national governments, as may be necessary to give to every boy the opportunity to learn how to earn his living by his labor, and to till the soil for a livelihood, and get his living from the land.

Some of the State school authorities, officers in agricultural colleges, and county superintendents of schools have prepared outlined courses in agriculture which have exerted a strong influence toward the teaching of agriculture in the rural schools. Such courses have been prepared, for example, in Missouri, Illinois, and Indiana, and

for a group of schools under one superintendent in Durham, N. H., and vicinity.

The Illinois course in agriculture was prepared by the dean of the college of agriculture, and gives the following reasons for teaching agriculture in the public schools:

(1) To cultivate an interest in and instill a love and respect for land and the occupation of agriculture.

(2) To create a regard for industry in general and an appreciation of the material side of the affairs of a highly civilized people.

(3) To cultivate the active and creative instincts, as distinct from the reflective and receptive, that are otherwise almost exclusively exercised in our schools.

(4) To give practice in failure and success, thus putting to the test early in life the ability to do a definite thing.

(5) To train the student in ways and methods of acquiring information for himself and incidentally to acquaint him with the manner in which information is originally acquired and the world's stock of knowledge has been accumulated.

(6) To connect the school with real life and make the value and need of schooling the more apparent.

(7) As an avenue of communication between the pupil and the teacher, it being a field in which the pupil will likely have a larger bulk of information than the teacher, but in which the training of the teacher can help to more exact knowledge.

The course is arranged by months and gives suggestions for a large number of experiments and observations bearing on all the divisions of agriculture. Considerable reading along agricultural lines is suggested, as well as drawing, composition, and other work intended to correlate agriculture with other school work. All technical words likely to be used frequently in this connection are defined.

This course has been in the hands of Illinois teachers one year, and the superintendent of public instruction reports "an increased interest throughout the State in the study of agriculture." He says:

In nearly every county in the State a good beginning has been made, and in several counties the interest and progress has been little less than remarkable. In many rural schools the subject is being studied following the outline found on pages 166–180 of the Illinois Course of Study for the Common Schools. Some of the graded schools are doing systematic and intelligent work along this line and are conducting in connection with the schools successful school gardens. That the interest is growing is shown by the many thousand requests for corn and seeds which are received by the secretary of the farmers' institute.

According to statistics collected by the superintendent of farmers' institutes in Illinois, fourteen counties report that in nearly all the schools agriculture is being taught as suggested in the State course of study, and in fifteen other counties a majority of the schools are attempting this work.

In addition to agricultural work in the schools of Illinois, considerable is done by the State College of Agriculture, the superintendent and the secretary of farmers' institutes, and county superintendents

of schools to arouse an interest in farm life by means of clubs of farmers' boys, which are organized in the different counties for the purpose of conducting experiments at their homes in testing improved varieties of corn and sugar beets. These clubs hold regular meetings similar to farmers' institutes, and once a year are given places on the programmes of the county farmers' institutes. Several of these clubs have had lecture courses with lectures from men prominent in the agricultural colleges and experiment stations, and some of them have gone on excursions to different agricultural colleges. Eight thousand of these boys exhibited corn of their own raising at the Louisiana Purchase Exposition, and 1,250 of them drew prizes ranging from 50 cents to $500. The girls have similar organizations which are devoted to the consideration of subjects relating to the farm home.

Similar organizations of boys and girls are also found in Iowa, Ohio, and Texas, all of them organized under the auspices of the State agricultural colleges or of agricultural journals. The membership of the boys' and girls' clubs in Ohio is nearly 2,000 and in Texas over 1,200, though the latter organizations are little more than a year old. Everywhere that work of this kind has been done it has seemed to meet with enthusiastic approval. The boys and girls take pride in their organizations and in doing in a small way what their parents do more extensively.

In Missouri the course in agriculture for the public schools was prepared several years ago by the State superintendent of schools. This course has been superseded by a bulletin prepared by the State superintendent of schools and published by the Missouri State Board of Agriculture in September of the present year, entitled Elements of Agriculture for the Public Schools. This bulletin advocates presenting the subject of agriculture "(1) by experiments at home and in the field, (2) by studying facts as given in texts and bulletins, and (3) by school gardens connected with school grounds."

Teachers are advised to utilize school grounds, or gardens near the school, as experiment stations, to have pupils experiment at home and make field observations, and to secure bulletins from the Department of Agriculture, at Washington, D. C., from the Missouri State Board of Agriculture, and from the agricultural college, both at Columbia. The school library should have copies of several good texts. Appeal to the pupils' interests along all lines and enlist the cooperation of the parents.

The course in agriculture, as outlined in the bulletin, includes (1) studies on soil—origin and composition, kinds, plant food, improvement, rotation of crops, and experiments; (2) roads—value of good roads, road drainage, artificial roads, good dirt roads, influence of roads, road laws, and experiments; (3) studies on seeds and related subjects—germination, vitality and parts of seeds, with experiments

in corn planting, corn growing, corn judging, selecting seed corn, and observations and experiments with corn (similar treatment of wheat); (4) studies of plants—their classification, relation to soils, buds, twigs, etc.; (5) orcharding and gardening—apples, grapes, berries, home gardening, commercial gardening, enemies to gardens; (6) study of insects; and (7) stock raising and feeding—horses, mules, cattle, sheep, hogs, and domestic fowls. Numerous experiments and observations are suggested throughout the bulletin. Two bulletins have also been issued by the College of Agriculture of the University of Missouri which are intended for use in the public schools. One of these is on Plant Propagation and the other on The Principles of Plant Production—the Seed.

The superintendent of public schools, the College of Agriculture, and the State normal schools in Missouri are cooperating in agitating the introduction of agriculture into the public schools throughout the State. This is done by addressing teachers' institutes, farmers' institutes, and other public meetings; by conducting summer schools for teachers at the College of Agriculture, in which special attention is given to courses which will prepare them for teaching agriculture; and by conducting regular courses in agriculture at the three State normal schools.

The State superintendent of public instruction of Indiana, in his State Manual and Uniform Courses of Study for the Elementary Schools of Indiana, 1904–5, includes a nature study course intended "to acquaint the pupil with his environment and to train him to see and understand the relationship and meaning of common things," and a course in elementary agriculture. The subjects suggested for consideration in the nature course are largely the plant and animal life of the farm and the garden. The course in agriculture is simply an outline intended to guide the teacher, taking up for the first consideration plant and animal products; then the soil, its formation, nature, tillage, and enrichment; and, finally, plant life. References are given to a number of bulletins and elementary text-books of agriculture.

The department of agriculture of the University of Minnesota has been actively engaged in promoting the teaching of agriculture in the rural schools, and its officers have prepared a bulletin on Rural School Agriculture for the use of the teachers in that State. In Wisconsin the State superintendent of the public schools and the officers of the College of Agriculture of the University of Wisconsin have done much for the introduction of agricultural teaching in the country. One of the results of their efforts has been the enactment of a law requiring teachers to pass examinations in agriculture. Similar laws have also been enacted in Maine, Nebraska, North Carolina, South Carolina, and Tennessee.

The training of teachers along agricultural lines is receiving considerable attention, not only in Missouri, as mentioned above, but also in other States. The College of Agriculture of Cornell University now provides a two-year normal course in nature study and gardening. In Michigan ten county normal training schools have recently been opened for the purpose of training teachers for the rural schools. The course of study recommended for these normal schools by the State superintendent of public instruction includes agriculture. The agricultural colleges in Connecticut, Nebraska, and North Carolina have for a number of years conducted summer schools for teachers, at which more or less attention has been given to nature study and agriculture. At the Nebraska summer school in 1904 there were 23 students in nature study and 30 in agriculture. At the North Carolina summer school for teachers in 1904 there were enrolled 977 teachers, of whom 477 took work in agriculture. The summer school of the South, conducted at the University of Tennessee, with an annual attendance of from 1,000 to 1,300 teachers from all parts of the South, gives considerable attention to nature study and gardening.

One thing that has given a great impetus to the movement for the introduction of agriculture into the public schools has been the improvement of text-books and works of reference. Within the last year or two a number of elementary text-books in agriculture have been published, and some of these seem very well suited to use in the rural schools. One of the indirect results of the appearance of these text-books has been legislation in a number of States requiring the teaching of agriculture in all the rural schools, and adopting text-books for that purpose. State adoption of text-books in agriculture has been made in Alabama, Georgia, Louisiana, North Carolina, and Tennessee. Every city and county in Virginia, a majority of the counties in Maryland, about 15 counties in California, and a number of counties in Florida have also adopted text-books in agriculture for regular use in the public schools. It is estimated from teachers' reports that at least 12,000 children received instruction in agriculture in North Carolina last year. Thus it will be seen that there is quite a strong movement for the introduction of agriculture into the rural schools and that this movement is rapidly gaining momentum.

OBSTACLES TO THE GENERAL INTRODUCTION OF AGRICULTURE INTO THE RURAL SCHOOLS.

There are many things which have a tendency to hinder the rapid progress of this movement. One of these is the conservatism or apathy of school officers. This applies not only to local officers but also to State superintendents of public instruction, county superintendents of schools, and the officers of agricultural colleges in many of

the States. Some of these officers doubt the possibility or wisdom of teaching agriculture in the common schools on account of the lack of text-books, or the lack of trained teachers, or for some other reason. It is, however, a notable fact that in the States where such officials are cooperating actively and earnestly in conducting a lively campaign along these lines, agriculture is actually being taught with considerable success, and teachers who feel that they are unprepared in this branch are flocking to summer schools where they can make the necessary preparation.

Another difficulty is that the teachers in rural districts are mostly women with little or no normal training either in the ordinary branches taught in the common schools or in special subjects. There is no teaching profession in the rural schools. The salaries are so low that they do not attract those who have prepared themselves for the profession of teaching. As a consequence, most of the teachers found in rural schools are beginners or those who have not been sufficiently successful to be called to positions offering a higher salary. Most of the men who are teaching in the country are doing so merely for the purpose of raising money to go away to school or to go into business.

These conditions result in a rapid shifting of teachers from school to school, which is another serious drawback to progress of any kind. Again, the terms of school are too short. When a child can go to school only four or five months in the year there is little time in the few years that he is in school for the study of other subjects than reading, writing, arithmetic, geography, and history. Before much progress can be made in the introduction of agriculture into the rural schools much must be done for the general improvement of those schools. This improvement will be brought about partly by remedying the conditions already mentioned in the school districts as they are now organized, and partly through the consolidation of small districts and the organization of centralized schools, including rural high schools where village high schools are not readily available for those who can go beyond the grammar grades. The practice of consolidating schools has already been resorted to in California, Colorado, Connecticut, Florida, Georgia, Indiana, Iowa, Kansas, Maine, Massachusetts, Michigan, Minnesota, Nebraska, New Hampshire, New Jersey, New York, North Dakota, Ohio, Pennsylvania, Rhode Island, South Dakota, Vermont, Washington, and Wisconsin. Notable movements toward the consolidation of schools have recently been inaugurated in Louisiana, Missouri, and North Carolina. While this movement toward consolidation has spread to all parts of the country, there are relatively few localities in any State in which the system has been adopted and brought into working order. Hence the full effect of this important change in school policy has not been felt, even in the States where consolidation is a feature.

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In the localities where consolidation has been thoroughly tried, however, it has usually met with general approval. It has enabled the school officers to grade the schools more effectually, thereby opening the way to greatly enriched courses of study; to lengthen the term of school; to employ better teachers at higher salaries and keep them for a number of years, and to employ several teachers instead of one, each to give instruction in only a few subjects or to only two or three grades, thereby opening the way to the more continuous and profitable employment of the pupils' time. It is notorious that in the ordinary country school where the teacher has from 25 to 30 recitations in a day and can not personally direct the study of the children, the latter waste fully half of their time in idlenesss or mischief-making. This and many other defects of the rural common school are remedied by consolidation, and the transportation of pupils from distant parts of the district at public expense is accomplished at no additional expense per unit of attendance. The Commissioner of Education in his annual report for 1903 says, "The possibilities of consolidation in the way of furnishing better and cheaper schools have been fully demonstrated, and such being the case its general adoption would seem to be only a question of time."

While consolidation opens the way for the more general introduction of courses in agriculture in the rural schools, it does not help supply the demand for teachers competent to give such special instruction. This can only be done by a more general and concerted effort on the part of the agricultural colleges and schools and the State normal schools, at present through the introduction of short and special courses in agriculture for teachers and later through regular normal courses in agriculture.

Fortunately, the attention of the general school officers throughout the country is now being strongly drawn toward the needs of the rural schools, and in many States strenuous efforts are being made to improve the general condition of these schools. Our urban communities are coming to see more clearly that their prosperity is vitally associated with the prosperity of agriculture, and they therefore more readily assent to State taxation for the benefit of the rural as well as the city schools. Advantage should be taken of the increased prosperity of many of our agricultural regions to impress upon our farmers the wisdom of building better schoolhouses, improving the school grounds, increasing the pay of teachers, and introducing the teaching of agriculture in the country districts, as an investment which will greatly aid in perpetuating and increasing the prosperity they now enjoy and make the lot of their descendants more fortunate than their own. The agricultural colleges and the farmers' institutes can have great influence in this direction.

OBJECT OF TEACHING AGRICULTURE.

Coming now to consider what should be the aim of instruction in agriculture in the elementary school and how it should be related to the general scheme of elementary education as formulated and approved by educational authorities, we have for our guidance the report of the Committee of Fifteen of the National Educational Association. In this report it is assumed and argued that the studies of the school fall naturally into five coordinate groups: First, mathematics and physics; second, biology, including chiefly the plant and the animal; third, literature and art; fourth, grammar and the technical and scientific study of language; and fifth, history and the study of sociological, political, and social institutions. Dr. W. T. Harris, United States Commissioner of Education, in a paper discussing this report and the necessity for five coordinate groups of studies in the schools, says:

> Each one of these groups, it was assumed, should be represented in the curriculum at all times by some topic suited to the age and previous training of the pupil.

Continuing, he says:

> The first stage of school education is education for culture, and education for the purpose of gaining command of the conventionalities of intelligence. These conventionalities are such arts as reading and writing and the use of figures, technicalities of maps, dictionaries, the art of drawing, and all of those semi-mechanical facilities which enable the child to get access to the intellectual conquests of the race. Later on in the school course, when the pupil passes out of his elementary studies, which partake more of the nature of practice than of theory, he comes in the secondary school and the college to the study of science and the technic necessary for its preservation and communication. All these things belong to the first stage of school instruction whose aim is culture. On the other hand, post-graduate work and the work of professional schools have not the aim of culture as much as the aim of fitting the person for a social vocation. In the post-graduate work of universities the demand is for original investigation in special fields. In the professional school the student masters the elements of a particular practice, learning its theory and its art.
>
> It is in the first stage, the schools for culture, that these five coordinate branches should be represented in a symmetrical manner. It is not to be thought that a course of university study or that of a professional school should be symmetrical. But specializing should follow a course of study for culture in which the symmetrical whole of human learning and the symmetrical whole of the soul should be considered. From the primary school, therefore, on through the academic course of the college, there should be symmetry and five coordinate groups of studies represented at each part of the course, at least in each year, although perhaps not throughout each part of the year.

Discussing the second coordinate group, the biological, Doctor Harris argues that it should include "whatever is organic in nature—especially studies relating to the plant and the animal—the growth of material for food and clothing, and in a large measure for means of transportation and culture. This study of the organic phase of

nature forms a great portion of the branch of study known as geography in the elementary school."

While it is probably true that eight years ago, when this was written, geography as taught in the primary grades of the best city schools included all the studies relating to the plant and the animal that were at that time considered necessary, it is also true that at the present time much of this study is introduced under the term "nature study," and the child's knowledge of the phenomena of plant and animal life is much clearer and more definite by reason of the concrete methods employed in nature study.

In the average village and rural school nothing approaching adequate instruction in the biological group of studies has ever been given. Geography, as far as taught in the primary grades, has consisted almost entirely of text-book work and has had in it very little that is concrete or that touches the experience of the child. Nature study, on the other hand, begins with the concrete—with the organic life of the school yard, the garden, and the farm. It has, therefore, a very definite and useful place to fill among the culture studies, particularly the biological studies of the primary grades. Elementary nature study, together with an informal study of local geography, might well supersede the formal study of geography during the first three or four years. This should be followed by more formal geography and nature study, the latter to be superseded by the elements of agriculture when the child is eleven or twelve years old.

Agriculture should not be confused with manual training as taught in the city schools. Manual training "relates to the transformation of materials, such as wood or stone or other minerals, into structures for human use," and draws more from the mathematical group of studies than from the biological. Agriculture, on the other hand, is confined mainly to things biological. Its purpose in the common schools is to awaken an interest in the work and life of the farm, show the progress being made in the improvement of farming, indicate the rational and scientific basis of modern agriculture, and give the pupil an outlook toward the work of the experiment stations, agricultural schools and colleges, and other agencies for his future education or assistance in his life work.

The motive for teaching agriculture in the rural school may, however, to a considerable extent be the same as that for manual training in the city school, namely, to bring the child into direct and sympathetic relations with the industrial life of the community in which he lives. Undoubtedly manual training in the city school has an outlook toward the shop, factory, and kitchen, and in the same way agriculture in the rural school should be directly related to the practical work of the farm.

A REASONABLE PROGRAMME FOR AGRICULTURAL TEACHING IN THE RURAL COMMON SCHOOLS.

Whenever it is proposed to introduce the teaching of agriculture into the rural common schools the objection is at once raised that the curriculum is already crowded; there is no time for more. This is true. There is no time for more, but there is time for better. It would be undesirable and unwise to do away with any of the studies now regularly taught in the common schools, but it would be wise to make a more judicious selection of the topics to be included in the courses in the various branches and omit much which now occupies the time of the pupils but which is not likely ever to be of use to them. Prof. Frank M. McMurray, of the Teachers' College of Columbia University, in a recent article discussing Advisable Omissions from the Elementary Curriculum, and the Basis for Them,[a] says, "Life is too full of large specific ends to be attained to allow time for work that has no really tangible object." As a basis for the rejection of subject-matter from school courses he holds to the following propositions:

(1) Whatever can not be shown to have a plain relation to some real need of life, whether it be æsthetic, ethical, or utilitarian in the narrower sense, must be dropped.

(2) Whatever is not reasonably within the child's comprehension, likewise.

(3) Whatever is unlikely to appeal to his interest; unless it is positively demanded for the first very weighty reason.

(4) Whatever topics and details are so isolated or irrelevant that they fail to be a part of any series or chain of ideas, and therefore fail to be necessary for the appreciation of any large point. This standard, however, not to apply to the three R's and spelling.

He does not favor the entire omission of any subject now taught in the elementary schools, but does recommend the omission of particular topics and details. Omission, however, is not the only remedy that he suggests for the crowded condition of the elementary school curriculum. In the last paragraph of this article he says:

In conclusion, although some large topics should be omitted, reform in the main is not to be effected by lopping off here and there, but by changing the present aggregation of ideas in each study to an organized body of thought. It is not the task of grade teachers nor of scientists, but of the most advanced and ablest students of education, who are as well posted in subject-matter as in the principles of education itself. Even these have more than a life problem in such a task.

It is along lines such as these that the curriculum of the rural schools may be so far improved that there will be ample space for the teaching of agriculture in an effective way. Just as the courses in the city schools have been improved and enriched by the introduction of manual training, so the teaching of agriculture in the rural schools,

[a] Ed. Rev., 27 (1904), No. 5, p. 478.

when once parents and teachers are convinced of its importance and benefits, will be found to be both practicable and advantageous.

In a rural school having a curriculum extending over about eight years the courses in nature study might follow in a general way the brief outlines given below. In these outlines it is assumed that the nature-study courses will extend over about six years, and be followed by a course in agriculture extending over two years.

NATURE STUDY.

During the first two or three years in school the children should spend a short time each week in forming an acquantance with the birds, insects, flowers, trees, and other animal and plant life of the schoolyard, the roadside, and the wayside pastures and wood lots. This very pleasant and profitable way of gaining knowledge has been their principal occupation during the two or three years that they have been running about out of doors at home, and they should be encouraged and aided to extend their knowledge of the things in nature with which they are likely to come in daily contact throughout their lives. The teacher should go with the children on short walks around the school yard and along the roads during occasional noon intermissions, or on longer trips in the fields and woods on Saturdays. It would be well if only a few children were taken at a time; ten or fifteen are all that one teacher can manage on such occasions. Each trip should be taken with some leading object in view, such, for example, as a search for cocoons, or for grasshoppers, or for weed seeds; but this leading object should not shut the eyes of the children to other things. Let them see and hear and feel and smell; let them grow in strength as well as in knowledge. Tell them very little; they should do the telling. Better wait days and weeks for an answer from the children than tell them now and rob them of the pleasure of discovery, provided the subject is within their comprehension.

Nature study at first should consist mainly of observations. The perceptive faculties should be stimulated and developed. For this reason the exercises should never be continued so long as to become wearisome to the children. At first there will seem to be but little connection between the different observations made by the children, but the teacher should never lose sight of the fact that very real and definite relationships exist between the different plants and animals of a given locality and between these things and their inorganic environment. Gradually, therefore, these relationships should be brought out. The children should describe and draw the objects seen. This will lead to comparison and judgment. Suppose, for example, that the children examine two trees of the same species, one growing in open ground with an abundance of plant food and plenty

of room for development; the other growing in a dense forest with little room for either root or branch; one with short, stocky trunk and dense, symmetrical top; the other with tall, slender trunk and small, irregular top. By comparing certain well-known features of bark and leaves the children will readily recognize the two trees as belonging to the same species, but it will require considerable exercise of the reasoning faculties and pretty good judgment for them to get at the causes which have brought about the marked differences between them. Such opportunities to reason and judge are frequently offered in nature study and the teacher should improve every opportunity to place them before her pupils.

After the first year or two, the time depending on the progress the children have made, more attention should be given to studying life histories of plants and animals (especially birds and insects), so that these may be recognized in all stages of their development, and their economic relations determined. This will enable the pupils to decide whether a given species is mainly beneficial or harmful and will set them to thinking about means of perpetuating or exterminating the species. This last consideration is the one which mainly determines the attitude of the farmer toward his field crops, domestic animals, and fowls, as well as toward the weeds and other pests that annoy him. When the nature-study teacher and her pupils have arrived at this point of view, they will be in a position to pass over as unimportant such details as color of hair, length and number of teeth, number of leaves, length of petioles and internodes, and a hundred other peculiarities of plants and animals, except as these peculiarities have a direct bearing upon the perpetuation of the species or upon their usefulness or harmfulness to man. Such a point of view and such an attitude toward the things studied will aid greatly in developing in the children the faculty of critical discernment. This faculty, according to President Eliot, of Harvard, "ought to be carefully and incessantly cultivated by school, college, and the experience of life, for it is capable of contributing greatly to happiness as well as to material success."

Such critical studies of plants, animals, soils, weather conditions, and other natural objects and phenomena, in their relation to each other and to man, will give the pupils an excellent preparation to take up at the beginning of their sixth or seventh year in school the more formal study of the elements of agriculture.

ELEMENTARY AGRICULTURE.

The course in elementary agriculture may be given most appropriately during the last two years in the rural common school. The time to be devoted to this course will necessarily vary in different schools, but it is believed that on the average not less than one hour

per week during two years will be required to make the course effective. A well-arranged and up-to-date text-book, with illustrations and suggestions for practical exercises, should be adopted as a basis for this study. A few such books already exist and an increased demand would undoubtedly lead to the production of others and the still further improvement of books of this class. The text-books will in most cases be necessary to a more or less definite guide for the teacher, who will in all probability be without special training in agriculture. It will also be helpful to the pupils in giving a systematic view and in fixing definite knowledge of the subject, and to the parents in showing them what such instruction really involves and in creating an interest in the subject-matter of books.

The instruction in the class room should be supplemented by simple experiments with soils, plants, and animals both at school and at home. Every effort should be made to connect the instruction with the home life of the pupils. As an aid to the accomplishment of this aim the pupils should be taken on occasional Saturday excursions to neighboring farms to see improved live stock, examine plans of buildings, and take notes on methods of cropping and cultivating. Visits to county fairs, where arrangements could be made to allow the older pupils to judge some of the live stock, fruits, and grain, and compare their scores with the work of the judges, would be fine training for the classes in agriculture. This scheme has been tried with older students of agriculture and has met with thorough approval. The officers of the fairs could probably be induced to offer prizes for products grown by the pupils and for other agricultural work done by them; or special exhibits of their work could be made at farmers' institutes or other meetings attended by their parents. All these things would tend to create an interest in farm life, and would encourage parents to make the farm more attractive to the children.

The schoolrooms should be provided with illustrative material consisting of charts, pictures, collections of specimens (largely made by the pupils), and boxes, cans, plates, and other inexpensive material which can be used in making apparatus for conducting experiments. There should also be a school library containing at least a few standard reference books on the different divisions of agriculture and the publications of the State experiment stations and the United States Department of Agriculture.

The text-book on agriculture should give an orderly and progressive treatment of the elements of plant production, animal production, and dairying, together with brief and very elementary discussions of a few topics in rural engineering and rural economics. The following syllabus shows in a general way what such a text-book might include:

SYLLABUS OF ELEMENTARY COURSE IN AGRICULTURE.[a]

I. PLANT PRODUCTION.

- **(1) The plant**
  - Structure.
  - Physiology—how plants
    - Feed.
    - Grow.
    - Reproduce by
      - Seeds — Trace life history from seed to seed, noting pollination, crosses, hybrids, etc.
      - Bulbs.
      - Cuttings.
      - Grafts.
      - Buds.
- **(2) The environment of the plant**
  - Climate — Light. Heat. Moisture. Air. — Study these in relation to plant growth.
  - Soil
    - Nature and functions.
    - Origin.
    - Properties — Distinguish between light and heavy soils, porous and impervious soils, soils that bake and those which do not, etc.
    - Classification — Main classes, such as sand, clay, loam, peat, silt.
    - Temperature.
    - Aeration.
    - Moisture.
    - Management
      - Tillage.
      - Drainage.
      - Irrigation.
      - Enrichment
        - Farm manures.
        - Commercial fertilizers
      - Impoverishment.
      - Cropping—rotation.

[a] In this syllabus the same general arrangement of topics has been made as in the higher courses outlined by this committee, but it is of course to be understood that the treatment of these topics by the teacher in the common school should be brief, simple, and elementary.

- **(3) Farm crops.**
  - Classification... Include only the most general classes, such as cereals, grasses, legumes, tubers, etc.
  - Individual crops. (Study one or more of the leading crops of the region.)
    - Name.
    - Place in classification.
    - Varieties.
    - Culture
      - Preparation of soil.
      - Selection of seed.
      - Testing of seed.
      - Planting.
      - Cultivating.
      - Protection from pests
        - Weeds.
        - Diseases.
        - Insects.
        - Birds.
        - Mammals.
      - Harvesting.
      - Marketing.
- **(4) Fruits**..... One or more of the leading fruits of the region should be studied in the same manner as farm crops.

II. ANIMAL PRODUCTION.

- **(1) Domestic animals—their types and breeds.** Bring out leading characteristics of one or two leading breeds of each type represented in a given region.
  - Horses
    - Draft.
    - Trotting.
    - Roadsters, etc.
  - Cattle
    - Dairy.
    - Beef.
  - Sheep
    - Wool.
    - Mutton.
  - Swine.
  - Poultry.
  - Bees.
- **(2) Care and management of domestic animals.**
  - Feeding.... Only the most general statements regarding the food requirements of different animals and for different purposes, and exercises in compounding rations suitable to a given region.
  - Hygiene....
    - Water supply.
    - Exercise.
    - Shade.
    - Condition of inclosures as to
      - Comfort.
      - Ventilation.
      - Cleanliness.
  - Preparation and care of product.
  - Marketing product.

III. DAIRYING.

- **(1) The dairy cow.**
  - Type..... A more detailed study of the dairy type than was given under animal production.
  - Feeding, care, and management.

- (2) Milk
  - Composition
    - How determined.
    - Relation to price.
  - Handling
    - Cleanliness
      - Stables.
      - Cows.
      - Attendants.
      - Vessels.
      - → Relation to souring or tainting of milk.
    - Straining.
    - Aerating.
    - Cooling.
  - Uses
    - For consumption as milk or cream.
      - Putting up in cans or bottles.
      - Marketing.
    - For condensing.
      - Putting in cans and hauling.
    - For cheese making.
    - For butter making.
      - Creaming
        - By setting in pans.
        - By use of separator.
      - Churning
        - Temperature.
        - Kinds of churns.
      - Salting.
      - Coloring.
      - Working.
      - Packing.
      - Marketing.

IV. RURAL ENGINEERING.

It is not thought that the pupils in a rural common school will be prepared to study the problems involved in rural engineering from the view point of the engineer, but it is hoped that there will be some opportunity to examine the plans and structure of good types of buildings, fences, roads, etc., and to devote some time to drawing simple plans of farms, buildings, and other works. The importance of good roads, hygienic water supply and sewage disposal, and of caring for farm machinery should be emphasized.

- (1) **Farm plans**
  - Size and location of fields.
  - Location of buildings, fences, drains, and roads.
- (2) **Construction of buildings and works**
  - Buildings
    - House.
    - Barn.
    - Outbuildings.
    - Fences.
  - Water system.
  - Sewage system.
  - Roads.
  - Irrigating system
    - Only in regions where irrigation is practiced.

(3) **Farm machinery**	Interesting facts regarding the development of farm machinery in a way to encourage the more general use of improved machinery. The importance of caring for and repairing farm machinery.

V. RURAL ECONOMICS.

Most of the topics under rural economics are too broad to be included in a brief course in agriculture, or too complex for the comprehension of common school pupils. It is thought, however, that some of the general principles of marketing and farm accounts might be taught in this connection. The main factors in marketing will probably be best considered in connection with the disposal of particular products as indicated above under plant production, animal production, and dairying. The following topics are appropriate for this course:

(1) **Marketing**	Preparation for market. Choice of market. Transportation. Method and cost of sale.	
(2) **Farm accounts**	Feed and milk records. Crop records. Breeding records. Inventories. Bookkeeping.	This to include only the most general suggestions and a discussion of the importance of keeping full and accurate records.

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Publication authorized.
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[CIR. 60]

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